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**Work Order No. 03917.008.005**

**No. 3 Recovery Boiler  
Nitrogen Oxides  
Emission Test Report  
Bowater Incorporated  
Catawba, South Carolina  
3 August 2005**

Prepared For

**BOWATER INCORPORATED**

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**17 August 2005**



## TABLE OF CONTENTS

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<b>SECTION 1</b>	<b>INTRODUCTION.....</b>	<b>1-1</b>
<b>SECTION 2</b>	<b>RESULTS AND DISCUSSION.....</b>	<b>2-1</b>
<b>SECTION 3</b>	<b>SOURCE TESTING METHODOLOGY .....</b>	<b>3-1</b>
<b>APPENDIX A</b>	<b>SAMPLE CALCULATIONS</b>	
<b>APPENDIX B</b>	<b>TEST METHODOLOGY</b>	
<b>APPENDIX C</b>	<b>FIELD DATA – NO. 3 RECOVERY BOILER</b>	
<b>APPENDIX D</b>	<b>QUALITY CONTROL DATA</b>	
<b>APPENDIX E</b>	<b>PROCESS OPERATING DATA</b>	

## LIST OF TABLES

<b>Table 2-1</b>	<b>No. 3 Recovery Boiler Summary of NO<sub>x</sub> Emission Results .....</b>	<b>2-1</b>
<b>Table 3-1</b>	<b>Source Testing Methodology .....</b>	<b>3-1</b>



## SECTION 1 INTRODUCTION

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Weston Solutions, Inc. (WESTON<sup>®</sup>) was retained by Bowater Incorporated (Bowater) to conduct nitrogen oxides (NO<sub>x</sub>) emission testing on the No. 3 Recovery Boiler at the mill in Catawba, South Carolina. The purpose of the testing was to demonstrate compliance with the South Carolina Department of Health and Environmental Control (DHEC) permit limits.

WESTON performed the emission testing on 3 August 2005. The project team was comprised of the following individuals.

Name	Project Role
Temp Simpkins	Project Manager/Test Team Leader
Wayne Roberts	Report Review
Paul Green	Test Team Member
Matt Savin	Test Team Member
Melanie Wright	Quality Representative
Natalie Hornsby	Report Coordinator

Mr. Jackquelyn Taylor of Bowater coordinated the testing with mill operations and served as WESTON's technical contact throughout the effort. Mr. Will Hinson of DHEC was present during the testing.



## SECTION 2

## RESULTS AND DISCUSSION

Table 2-1 presents a detailed summary of the emission testing with comparison to the permit limits. The results were less than the applicable standards for the source. Any differences between the calculated results in the appendices and the reported results in the summary table are due to rounding the results for presentation.

**TABLE 2-1**  
**NO. 3 RECOVERY BOILER**  
**SUMMARY OF NO<sub>X</sub> EMISSION RESULTS**

	Run 1	Run 2	Run 3	Mean
Date	8/3/05	8/3/05	8/3/05	----
Time Began	1300	1414	1521	----
Time Ended	1400	1514	1621	----
<b>Stack Gas Data</b>				
O <sub>2</sub> Concentration, %	5.5	5.5	5.4	5.5
<b>Nitrogen Oxides</b>				
Concentration, ppm	79	80	77	79
Concentration, ppm @ 8% O <sub>2</sub>	66	67	64	66
<b>Permit Limit, ppm @ 8% O<sub>2</sub></b>	----	----	----	<b>80</b>



## SECTION 3

### SOURCE TESTING METHODOLOGY

The emission testing program was conducted in accordance with the U.S. EPA Reference Methods summarized in Table 3-1. Method descriptions and quality assurance data are provided in the referenced appendices.

**TABLE 3-1**  
**SOURCE TESTING METHODOLOGY**

Parameter	Method Number	Appendix Reference		Comments
		Method Description	Quality Control Data	
Nitrogen Oxides	7E	B.1	D	Instrumental
Oxygen	3A	B.2	D	Instrumental



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## APPENDIX A

### SAMPLE CALCULATIONS

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## SAMPLE CALCULATIONS

### No. 3 Recovery Boiler Run No. 1

Nitrogen Oxides Concentration Corrected to 8% O<sub>2</sub>

$$\begin{aligned} &= \text{Bias Corrected } NO_x \text{ Concentration, ppm} \times \left( \frac{20.9 - 10}{20.9 - \text{Measured } O_2} \right) \\ &= 79 \left( \frac{20.9 - 8}{20.9 - 5.5} \right) \\ &= 66 \text{ ppm @ 8% } O_2 \end{aligned}$$



## **APPENDIX B**

### **TEST METHODOLOGY**

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#### **B.1      NITROGEN OXIDES**

#### **B.2      OXYGEN**

## B.1 NITROGEN OXIDES (INSTRUMENTAL)

Nitrogen oxides ( $\text{NO}_x$ ) testing was conducted in accordance with EPA Reference Method 7E.

### Sampling Equipment and Procedures

Figure B-1 illustrates the sampling system. The sample is withdrawn from the source through a heated probe, filter, and sample line to a sample conditioner, which removes moisture from the gas stream. The sample is then transported to a California Analytical Model 400-CLD Analyzer through a Teflon® line.

### Sample Analysis

The analyzer uses an oxidizing converter to produce nitric oxide (NO) molecules. A chemiluminescent reaction of NO and ozone is then used to produce nitrogen dioxide ( $\text{NO}_2$ ), oxygen ( $\text{O}_2$ ), and infrared light. This infrared light is measured using a highly sensitive optical filter/photomultiplier whose output is linearly proportional to the NO concentration.

### Data Acquisition and Reduction

Data are acquired electronically using an IBM compatible computer and software designed by WESTON for EPA Reference Method 7E analysis. This system generates a calibration curve, converts electronic signals into concentrations, and provides bias-corrected hourly averages.

### Quality Control

At the time of analysis, NO in nitrogen calibration gases, certified according to EPA Protocol-1, are used to calibrate the analyzer and to determine a bias correction factor for the entire system. Calibration and system response is performed in accordance with EPA Reference Method 7E.

Calibration gases are introduced directly to the analyzer to generate the calibration curve. A calibration gas is introduced at the probe and recovered through the sampling and analytical system. A bias correction factor is calculated using the ratio of the measured concentration of the bias gas and concentration certified by the vendor. An interference response study was performed by the manufacturer of the analyzer. The data from this study are on file at WESTON.

An  $\text{NO}_2$  to NO conversion efficiency test is performed on site in accordance with the procedure described in EPA Reference Method 20. The results from this study should indicate that the  $\text{NO}_2$  to NO conversion efficiency does not drop more than 2% from the highest level.

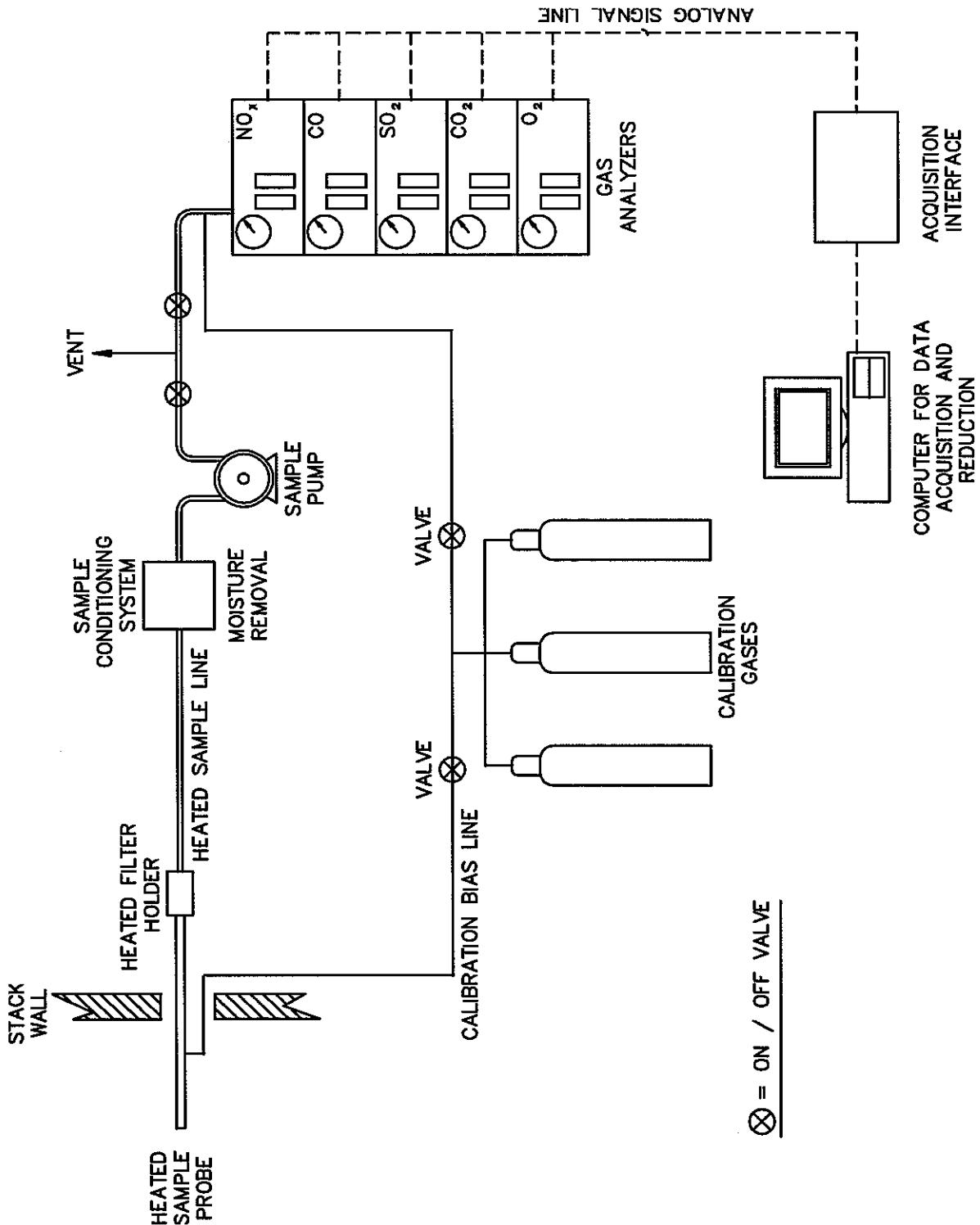


Figure B-1 Continuous Emission Monitoring System

## B.2 GAS COMPOSITION (INSTRUMENTAL)

Oxygen ( $O_2$ ) and carbon dioxide ( $CO_2$ ) testing is conducted in accordance with EPA Reference Method 3A.

### Sampling Equipment and Procedures

Figure B-1 illustrates the sampling system. The sample is withdrawn continuously from the source through a heated probe, filter, and sample line to a sample conditioner which removes moisture from the gas stream. The sample is then transported to a California Analytical Model 300  $O_2$  analyzer and a California Analytical Model 300  $CO_2$  analyzer.

### Sample Analysis

The  $O_2$  analyzer uses an electrochemical cell or paramagnetic detector and the  $CO_2$  analyzer uses a non-dispersive infra-red (NDIR) detector to produce an electrical signal which is linearly proportional to the  $O_2$  and  $CO_2$  concentration, respectively.

### Data Acquisition and Reduction

Data is acquired electronically using an IBM compatible computer and software designed by WESTON for EPA Reference Method 3A analysis. This system generates a calibration curve, converts electronic signals into concentrations, and provides one-minute averages during the sample run and an average concentration over the duration of the sample run.

### Quality Control

At the time of analysis,  $O_2$  and  $CO_2$  in nitrogen calibration gases certified according to EPA Protocol-1, are used to calibrate the analyzer and to determine a bias correction factor for the entire system bias in accordance with EPA Reference Method 3A. The calibration gases are introduced directly to the analyzer to generate the calibration curve. A zero gas and an upscale calibration gas is introduced at the probe and recovered through the sampling and analytical system. A bias correction factor is calculated using the ratio of the concentration measured from the sampling system and concentration measured directly at the analyzer. Sample run averages are corrected for system bias results.



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**APPENDIX C**

**FIELD DATA – NO. 3 RECOVERY BOILER**

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# RUN SUMMARY

Number 1

Client: Bowater  
Location: Catawba, SC  
Source: No. 3 Recovery Boiler  
Calibration: 1

Project Number: 03917.008.005  
Operator: T. Simpkins  
Date: 3 Aug 2005

Analyzer	O2	NOx
Method	EPA 3A	EPA 7E
Conc. Units	%	ppm

Time: 13:00 to 14:00

## Run Averages

5.6              76

## Pre-run Bias at 12:10

Zero Bias	0.1	0
Span Bias	10.0	124
Span Gas	9.9	129

## Post-run Bias at 14:04

Zero Bias	0.1	1
Span Bias	10.0	124
Span Gas	9.9	129

Run averages corrected for the average of the pre-run and post-run bias

5.5 ✓              79 ✓

T5

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# RUN SUMMARY

Number 2

Client: Bowater                          Project Number: 03917.008.005  
Location: Catawba, SC                          Operator: T. Simpkins  
Source: No. 3 Recovery Boiler                          Date: 3 Aug 2005  
Calibration: 1

Analyzer	O2	NOx
Method	EPA 3A	EPA 7E
Conc. Units	%	ppm

Time: 14:14 to 15:14

## Run Averages

5.6                          77

## Pre-run Bias at 14:04

Zero Bias	0.1	1
Span Bias	10.0	124
Span Gas	9.9	129

## Post-run Bias at 15:16

Zero Bias	0.1	1
Span Bias	10.0	124
Span Gas	9.9	129

Run averages corrected for the average of the pre-run and post-run bias

5.5 ✓                          80 ✓



# RUN SUMMARY

Number 3

Client: Bowater                          Project Number: 03917.008.005  
Location: Catawba, SC                          Operator: T. Simpkins  
Source: No. 3 Recovery Boiler                          Date: 3 Aug 2005  
Calibration: 1

Analyzer	O2	NOx
Method	EPA 3A	EPA 7E
Conc. Units	%	ppm

Time: 15:21 to 16:21

## Run Averages

5.5                          74

## Pre-run Bias at 15:16

Zero Bias	0.1	1
Span Bias	10.0	124
Span Gas	9.9	129

## Post-run Bias at 16:25

Zero Bias	0.1	1
Span Bias	10.0	124
Span Gas	9.9	129

Run averages corrected for the average of the pre-run and post-run bias

5.4 ✓                          77 ✓



**RUN DATA**

Number 1

Client: **Bowater**  
Location: **Catawba, SC**  
Source: **No. 3 Recovery Boiler**  
Calibration: **1**

Project Number: **03917.008.005**  
Operator: **T. Simpkins**  
Date: **3 Aug 2005**

Time	O2		NOx	
	mv	%	mv	ppm
Starting time 13:00				
13:01	2377	5.7	2660	80
13:02	2298	5.5	2614	79
13:03	2392	5.8	2592	78
13:04	2359	5.7	2612	79
13:05	2393	5.8	2598	78
13:06	2329	5.6	2538	76
13:07	2337	5.6	2565	77
13:08	2387	5.7	2552	77
13:09	2346	5.6	2560	77
13:10	2329	5.6	2560	77
13:11	2372	5.7	2515	76
13:12	2461	5.9	2549	77
13:13	2394	5.8	2528	76
13:14	2352	5.7	2422	73
13:15	2406	5.8	2430	73
13:16	2318	5.6	2441	73
13:17	2383	5.7	2470	74
13:18	2403	5.8	2454	74
13:19	2372	5.7	2454	74
13:20	2382	5.7	2449	74
13:21	2443	5.9	2412	73
13:22	2400	5.8	2441	73
13:23	2355	5.7	2492	75
13:24	2397	5.8	2463	74
13:25	2396	5.8	2483	75
13:26	2324	5.6	2538	76
13:27	2322	5.6	2508	75
13:28	2396	5.8	2456	74
13:29	2450	5.9	2476	74
13:30	2391	5.8	2537	76
13:31	2341	5.6	2532	76
13:32	2326	5.6	2530	76

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**RUN DATA**

Number 1

Client: **Bowater**  
Location: **Catawba, SC**  
Source: **No. 3 Recovery Boiler**  
Calibration: **1**

Project Number: **03917.008.005**  
Operator: **T. Simpkins**  
Date: **3 Aug 2005**

Time	O2		NOx	
	mv	%	mv	ppm
13:33	2311	5.6	2552	77
13:34	2347	5.6	2507	75
13:35	2281	5.5	2502	75
13:36	2340	5.6	2510	76
13:37	2372	5.7	2563	77
13:38	2309	5.5	2554	77
13:39	2315	5.6	2524	76
13:40	2359	5.7	2541	76
13:41	2378	5.7	2517	76
13:42	2339	5.6	2514	76
13:43	2248	5.4	2522	76
13:44	2238	5.4	2392	72
13:45	2295	5.5	2440	73
13:46	2320	5.6	2500	75
13:47	2227	5.3	2518	76
13:48	2273	5.5	2471	74
13:49	2334	5.6	2481	75
13:50	2350	5.7	2475	74
13:51	2331	5.6	2499	75
13:52	2269	5.4	2504	75
13:53	2251	5.4	2539	76
13:54	2255	5.4	2500	75
13:55	2232	5.4	2511	76
13:56	2231	5.4	2475	74
13:57	2246	5.4	2497	75
13:58	2251	5.4	2489	75
13:59	2220	5.3	2614	79
14:00	2318	5.6	2643	80
<b>Run Avg</b>	<b>2336</b>	<b>5.6</b>	<b>2513</b>	<b>76</b>

**RUN DATA**

Number 2

Client: **Bowater**  
Location: **Catawba, SC**  
Source: **No. 3 Recovery Boiler**  
Calibration: **1**

Project Number: **03917.008.005**  
Operator: **T. Simpkins**  
Date: **3 Aug 2005**

Time	O2		NOx	
	mv	%	mv	ppm
Starting time 14:14				
14:15	2240	5.4	2652	80
14:16	2229	5.3	2644	80
14:17	2246	5.4	2579	78
14:18	2302	5.5	2629	79
14:19	2316	5.6	2604	78
14:20	2402	5.8	2589	78
14:21	2376	5.7	2615	79
14:22	2340	5.6	2596	78
14:23	2282	5.5	2609	78
14:24	2348	5.6	2607	78
14:25	2281	5.5	2588	78
14:26	2309	5.5	2633	79
14:27	2202	5.3	2619	79
14:28	2349	5.6	2621	79
14:29	2412	5.8	2631	79
14:30	2369	5.7	2605	78
14:31	2295	5.5	2575	77
14:32	2334	5.6	2612	79
14:33	2413	5.8	2630	79
14:34	2387	5.7	2565	77
14:35	2336	5.6	2589	78
14:36	2282	5.5	2600	78
14:37	2292	5.5	2596	78
14:38	2271	5.5	2634	79
14:39	2234	5.4	2635	79
14:40	2261	5.4	2619	79
14:41	2285	5.5	2635	79
14:42	2299	5.5	2613	79
14:43	2277	5.5	2604	78
14:44	2295	5.5	2611	79
14:45	2326	5.6	2636	79
14:46	2353	5.7	2612	79

**RUN DATA**

Number 2

Client: **Bowater**  
Location: **Catawba, SC**  
Source: **No. 3 Recovery Boiler**  
Calibration: **1**

Project Number: **03917.008.005**  
Operator: **T. Simpkins**  
Date: **3 Aug 2005**

Time	O2		NOx	
	mv	%	mv	ppm
14:47	2302	5.5	2591	78
14:48	2298	5.5	2500	75
14:49	2254	5.4	2581	78
14:50	2284	5.5	2464	74
14:51	2354	5.7	2519	76
14:52	2397	5.8	2482	75
14:53	2405	5.8	2505	75
14:54	2427	5.8	2492	75
14:55	2423	5.8	2458	74
14:56	2517	6.1	2370	71
14:57	2416	5.8	2378	72
14:58	2382	5.7	2452	74
14:59	2410	5.8	2463	74
15:00	2398	5.8	2449	74
15:01	2392	5.8	2465	74
15:02	2379	5.7	2570	77
15:03	2439	5.9	2569	77
15:04	2414	5.8	2452	74
15:05	2384	5.7	2447	74
15:06	2306	5.5	2499	75
15:07	2335	5.6	2363	71
15:08	2397	5.8	2450	74
15:09	2345	5.6	2404	72
15:10	2358	5.7	2486	75
15:11	2342	5.6	2418	73
15:12	2383	5.7	2423	73
15:13	2324	5.6	2364	71
15:14	2364	5.7	2393	72
<b>Run Avg</b>	<b>2340</b>	<b>5.6</b>	<b>2543</b>	<b>77</b>

**RUN DATA**

Number 3

Client: **Bowater** Project Number: **03917.008.005**  
Location: **Catawba, SC** Operator: **T. Simpkins**  
Source: **No. 3 Recovery Boiler** Date: **3 Aug 2005**  
Calibration: **1**

Time	O2		NOx	
	mv	%	mv	ppm
Starting time 15:21				
15:22	2208	5.3	2612	79
15:23	2247	5.4	2486	75
15:24	2389	5.7	2509	75
15:25	2353	5.7	2502	75
15:26	2338	5.6	2559	77
15:27	2273	5.5	2536	76
15:28	2316	5.6	2466	74
15:29	2360	5.7	2511	76
15:30	2269	5.4	2538	76
15:31	2278	5.5	2531	76
15:32	2284	5.5	2601	78
15:33	2327	5.6	2617	79
15:34	2343	5.6	2627	79
15:35	2266	5.4	2588	78
15:36	2400	5.8	2604	78
15:37	2429	5.9	2622	79
15:38	2325	5.6	2673	80
15:39	2308	5.5	2622	79
15:40	2396	5.8	2534	76
15:41	2382	5.7	2526	76
15:42	2373	5.7	2534	76
15:43	2287	5.5	2500	75
15:44	2265	5.4	2468	74
15:45	2319	5.6	2470	74
15:46	2240	5.4	2459	74
15:47	2234	5.4	2512	76
15:48	2292	5.5	2490	75
15:49	2342	5.6	2441	73
15:50	2319	5.6	2466	74
15:51	2273	5.5	2425	73
15:52	2290	5.5	2403	72
15:53	2279	5.5	2389	72

**RUN DATA**

Number 3

Client: **Bowater**  
Location: **Catawba, SC**  
Source: **No. 3 Recovery Boiler**  
Calibration: **1**

Project Number: **03917.008.005**  
Operator: **T. Simpkins**  
Date: **3 Aug 2005**

<b>Time</b>	<b>O2</b>		<b>NOx</b>	
	<b>mv</b>	<b>%</b>	<b>mv</b>	<b>ppm</b>
15:54	2203	5.3	2304	69
15:55	2146	5.1	2414	73
15:56	2221	5.3	2355	71
15:57	2159	5.2	2312	70
15:58	2152	5.2	2291	69
15:59	2304	5.5	2282	69
16:00	2321	5.6	2277	68
16:01	2228	5.3	2318	70
16:02	2159	5.2	2371	71
16:03	2221	5.3	2374	71
16:04	2206	5.3	2429	73
16:05	2190	5.3	2387	72
16:06	2174	5.2	2286	69
16:07	2314	5.6	2311	70
16:08	2289	5.5	2337	70
16:09	2303	5.5	2419	73
16:10	2210	5.3	2404	72
16:11	2247	5.4	2467	74
16:12	2312	5.6	2463	74
16:13	2286	5.5	2434	73
16:14	2230	5.4	2417	73
16:15	2318	5.6	2399	72
16:16	2287	5.5	2378	72
16:17	2260	5.4	2407	72
16:18	2283	5.5	2429	73
16:19	2261	5.4	2414	73
16:20	2293	5.5	2447	74
16:21	2297	5.5	2453	74
<b>Run Avg</b>	<b>2281</b>	<b>5.5</b>	<b>2457</b>	<b>74</b>

Number 1

Client: **Bowater**  
Location: **Catawba, SC**  
Source: **No. 3 Recovery Boiler**

Project Number: **03917.008.005**  
Operator: **T. Simpkins**  
Date: **3 Aug 2005**

Starting Time: 12:10

**O<sub>2</sub>**

Method: EPA 3A  
Span Conc. 25.0 %

**Bias Results**

	Cal	Bias Response	Bias
Gas	%	mv	Error
Zero	0.0	154	0.1
Span	9.9	4085	10.0

**NO<sub>x</sub>**

Method: EPA 7E  
Span Conc. 275 ppm

**Bias Results**

	Cal	Bias Response	Bias
Gas	ppm	mv	Error
Zero	1	13	-0.4%
Span	127	4108	-1.1%

TS

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# BIAS AND CALIBRATION DRIFT

Number 2

Client: Bowater  
Location: Catawba, SC  
Source: No. 3 Recovery Boiler

Project Number: 03917.008.005  
Operator: T. Simpkins  
Date: 3 Aug 2005

Starting Time: 14:04

## O<sub>2</sub>

Method: EPA 3A  
Span Conc. 25.0 %

### Bias Results

	Cal	Bias Response	Bias
Gas	%	mv	Error
Zero	0.0	151	0.1
Span	9.9	4067	0.4% ✓

### Calibration Drift

	Initial*	Final	
Gas	%	mv	Drift
Zero	0.1	151	0.0%
Span	10.0	4067	0.0% ✓

\*Bias No. 1

## NO<sub>x</sub>

Method: EPA 7E  
Span Conc. 275 ppm

### Bias Results

	Cal	Bias Response	Bias
Gas	ppm	mv	Error
Zero	1	21	0.0% ✓
Span	127	4121	-1.1%

### Calibration Drift

	Initial*	Final	
Gas	ppm	mv	Drift
Zero	0	21	0.4% ✓
Span	124	4121	0.0%

\*Bias No. 1



# BIAS AND CALIBRATION DRIFT

Number 3

Client: Bowater  
Location: Catawba, SC  
Source: No. 3 Recovery Boiler

Project Number: 03917.008.005  
Operator: T. Simpkins  
Date: 3 Aug 2005

Starting Time: 15:16

## O2

Method: EPA 3A  
Span Conc. 25.0 %

### Bias Results

Gas	Cal %	Bias Response mv	Bias %	Bias Error
Zero	0.0	152	0.1	0.4%
Span	9.9	4072	10.0	0.4% ✓

### Calibration Drift

	Initial*	Final	
Gas	%	mv	%
Zero	0.1	152	0.1
Span	10.0	4072	10.0

\*Bias No. 2

## NOx

Method: EPA 7E  
Span Conc. 275 ppm

### Bias Results

Gas	Cal ppm	Bias Response mv	Bias ppm	Bias Error
Zero	1	22	1	0.0%
Span	127	4129	124	-1.1% ✓

### Calibration Drift

	Initial*	Final	
Gas	ppm	mv	ppm
Zero	1	22	1
Span	124	4129	124

\*Bias No. 2

# BIAS AND CALIBRATION DRIFT

Number 4

Client: Bowater  
Location: Catawba, SC  
Source: No. 3 Recovery Boiler

Project Number: 03917.008.005  
Operator: T. Simpkins  
Date: 3 Aug 2005

Starting Time: 16:25

## O2

Method: EPA 3A  
Span Conc. 25.0 %

### Bias Results

Gas	Cal %	Bias Response mv	%	Bias Error
Zero	0.0	154	0.1	0.4% ✓
Span	9.9	4064	10.0	0.4%

### Calibration Drift

Gas	Initial*	Final	Drift
Zero	0.1	154	0.0%
Span	10.0	4064	0.0% ✓

\*Bias No. 3

## NOx

Method: EPA 7E  
Span Conc. 275 ppm

### Bias Results

Gas	Cal ppm	Bias Response mv	ppm	Bias Error
Zero	1	47	1	0.0%
Span	127	4121	124	-1.1% ✓

### Calibration Drift

Gas	Initial*	Final	Drift
Zero	1	47	0.0%
Span	124	4121	0.0% ✓

\*Bias No. 3

# CALIBRATION

Number 1

Client: Bowater  
Location: Catawba, SC  
Source: No. 3 Recovery Boiler

Project Number: 03917.008.005  
Operator: T. Simpkins  
Date: 3 Aug 2005

Starting Time: 10:39

## O<sub>2</sub>

Method: EPA 3A  
Calibration Type: Linear Regression

### Calibration Results

%	Cylinder ID	Result, mv
Zero	-	94
9.9 ✓	CC132010 ✓	4050
20.0 ✓	CC160343 ✓	8065

### Curve Coefficients

Slope	Intercept	Corr. Coeff.
398.5	97.5	>0.9999

## NO<sub>x</sub>

Method: EPA 7E  
Calibration Type: Linear Regression

### Calibration Results

ppm	Cylinder ID	Result, mv
Zero	-	24
129 ✓	SG9164137BAL ✓	4239
256 ✓	CC208623 ✓	8539

### Curve Coefficients

Slope	Intercept	Corr. Coeff.
33.26	-1.1	0.9999

T3

WESTON  
SOLUTIONS

# CALIBRATION ERROR

Number 1

Client: Bowater  
Location: Catawba, SC  
Source: No. 3 Recovery Boiler

Project Number: 03917.008.005  
Operator: T. Simpkins  
Date: 3 Aug 2005

Starting Time: 10:39

O<sub>2</sub>

Method: EPA 3A

Slope 398.5

Intercept 97.5

Standard, %	Response, mV	%	Error, %
Zero	94	0.0	0.0
9.90	4050	9.9	0.0 ✓
20.0	8065	20.0	0.0

NO<sub>x</sub>

Method: EPA 7E

Slope 33.26

Intercept -1.1

Standard, ppm	Response, mV	ppm	Error, %
Zero	24	1	0.4
129	4239	127	-0.7 ✓
256	8539	257	0.4

TS

WESTON  
SOLUTIONS

## **ANALYZER INFORMATION**

Client: Bowater  
Location: Catawba, SC  
Source: No. 3 Recovery Boiler

Project Number: 03917.008.005  
Operator: T. Simpkins  
Date: 3 Aug 2005

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File Name: C:\Data\Bowater- Catawba, SC\Aug. 2005\No. 3 RB 080305.cem  
Computer: WSAUB60 Trailer: 261

---

Analog Input Device: Keithley KPCMCIA 16AI Card

---

### **Channel 1**

Analyte	O2
Method	EPA 3A, Using Bias
Analyzer Make & Model	CA 300
Full-Scale Output, mv	10000
Span Concentration, %	25.0

### **Channel 4**

Analyte	NOx
Method	EPA 7E, Using Bias
Analyzer Make & Model	CA-400-CLD
Full-Scale Output, mv	10000
Span Concentration, ppm	275





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## **APPENDIX D**

## **QUALITY CONTROL DATA**

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## Certificate of Analysis: EPA Protocol Gas Mixture

Cylinder Number: CC132010 Reference Number: 47-124031858-10  
Cylinder Pressure: 1999.6 PSIG Expiration Date: 3/18/2008 ✓  
Certification Date: 3/18/2005 Laboratory: ASG - Mobile - AL

Airgas Specialty Gases  
5480 Hamilton Boulevard  
Theodore, AL 36582  
251.653.2500 Fax: 251.653.2530  
[www.airgas.com](http://www.airgas.com)

### Certified Concentrations

Component	Concentration	Accuracy	Analytical Principle	Procedure
OXYGEN	9.930 %	+/- 1%	PARAMAGN	G1
CARBON DIOXIDE	10.02 %	+/- 1%	NDIR	G1
NITROGEN	Balance			

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed.  
Analytical Methodology does not require correction for analytical interferences.

Notes: Airgas PO 110807244

Do not use cylinder below 150 psig.

Approval Signature Cindy Shires

### Reference Standard Information

Type	Balance Gas	Component	Cyl.Number	Concentration
NTRM 81675	NITROGEN	CARBON DIOXIDE	SG9169303	13.84 %
NTRM 82658	NITROGEN	OXYGEN	SG9163062	9.51 %

### Analytical Results

#### 1st Component

		OXYGEN	
1st Analysis Date:		03/18/2005	
R 9.510	S 9.930	Z 0.000	Conc 9.930 %
S 9.930	Z 0.000	R 9.510	Conc 9.930 %
Z 0.000	R 9.510	S 9.930	Conc 9.930 %
			AVG: 9.930 %

#### 2nd Component

		CARBON DIOXIDE	
1st Analysis Date:		03/18/2005	
R 13.84	S 10.02	Z 0.000	Conc 10.02 %
S 10.02	Z 0.000	R 13.84	Conc 10.02 %
Z 0.000	R 13.84	S 10.02	Conc 10.02 %
			AVG: 10.02 %

## Certificate of Analysis: EPA Protocol Gas Mixture

Cylinder Number: CC160343 Reference Number: 47-124019676-6  
Cylinder Pressure: 2013.3 PSIG Expiration Date: 5/25/2007 ✓  
Certification Date: 5/25/2004 Laboratory: W04 - 124

**Airgas Specialty Gases**  
5480 Hamilton Blvd.  
Theodore, AL 36582  
(251) 653-2500 Fax: (251) 653-2530  
[www.airgas.com](http://www.airgas.com)

## Certified Concentrations

Component	Concentration	Accuracy	Analytical Principle	Procedure
CARBON DIOXIDE	20.18 %	+/- 1%	TCD	G1
OXYGEN	20.02 %	+/- 1%	PARAMAGNET	G1
NITROGEN	Balance			

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences.

#### **Notes:**

**Do not use cylinder below 150 psig.**

**Approval Signature**

Coal Student

## Reference Standard Information

Type	Component	Cyl.Number	Concentration
NTRM 40301	OXYGEN	CC9818	20.01 %
NTRM 82746	CARBON DIOXIDE	SG9198981	19.37 %

### Analytical Results

<b>1st Component</b>	<b>CARBON DIOXIDE</b>		<b>2nd Component</b>		<b>OXYGEN</b>		
1st Analysis Date:		05/25/2004		1st Analysis Date:		05/25/2004	
R 19.37	S 20.18	Z 0.000	Conc 20.18 %	R 20.01	S 20.02	Z 0.000	Conc 20.02 %
S 20.18	Z 0.000	R 19.37	Conc 20.18 %	S 20.02	Z 0.000	R 20.01	Conc 20.02 %
Z 0.000	R 19.37	S 20.19	Conc 20.19 %	Z 0.000	R 20.01	S 20.02	Conc 20.02 %
AVG: 20.18 %				AVG: 20.02 %			

## Certificate of Analysis: EPA Protocol Gas Mixture

Cylinder Number: SG9164137BAL Reference Number: 54-124028233-7  
Cylinder Pressure: 1999.6 PSIG Expiration Date: 2/1/2007  
Certification Date: 2/1/2005 Laboratory: ASG - Chicago - IL

### Certified Concentrations

Component	Concentration	Accuracy	Analytical Principle	Procedure
NITRIC OXIDE	126.0 PPM	+/- 1%	Chemiluminescence	G1
NITROGEN	Balance			

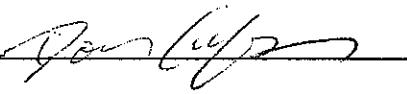
Total oxides of nitrogen

128.6 PPM

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed.  
Analytical Methodology does not require correction for analytical interferences.

### Notes:

Do not use cylinder below 150 psig.

Approval Signature 

### Reference Standard Information

Type	Balance Gas	Component	Cyl.Number	Concentration
NTRM 012105		NITRIC OXIDE	CC2595	247.5 PPM

### Analytical Results

#### 1st Component NITRIC OXIDE

1st Analysis Date: 01/25/2005

R 99.0	S 50.3	Z 0	Conc 125.7 PPM
S 50.4	Z 0	R 99.1	Conc 125.9 PPM
Z 0	R 99.1	S 50.4	Conc 125.9 PPM
			AVG: 125.8 PPM

2nd Analysis Date: 02/01/2005

R 99.0	S 50.6	Z 0	Conc 125.2 PPM
S 50.7	Z 0	R 99.0	Conc 126.7 PPM
Z 0	R 99.1	S 50.8	Conc 126.9 PPM
			AVG: 126.2 PPM

## Certificate of Analysis: EPA Protocol Gas Mixture

Cylinder Number: CC208623 Reference Number: 47-124031858-8  
Cylinder Pressure: 1999.6 PSIG Expiration Date: 3/28/2007  
Certification Date: 3/28/2005 Laboratory: ASG - Mobile - AL

Airgas Specialty Gases  
5480 Hamilton Boulevard  
Theodore, AL 36582  
251.653.2500 Fax: 251.653.2530  
[www.airgas.com](http://www.airgas.com)

### Certified Concentrations

Component	Concentration	Accuracy	Analytical Principle	Procedure
NITRIC OXIDE	253.0 PPM	+/- 1%	CHEMILLUM	G1
NITROGEN	Balance			

Total oxides of nitrogen

256.0 PPM

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed.  
Analytical Methodology does not require correction for analytical interferences.

Notes: Airgas PO 110807244

Do not use cylinder below 150 psig.

Approval Signature Clinton & Liles

### Reference Standard Information

Type	Balance Gas	Component	Cyl.Number	Concentration
NTRM 81687	NITROGEN	NITRIC OXIDE	XC018368B	987.0 PPM

### Analytical Results

#### 1st Component NITRIC OXIDE

1st Analysis Date: 03/18/2005

R 987.0	S 253.0	Z 0.000	Conc 253.0 PPM
S 253.0	Z 0.000	R 987.0	Conc 253.0 PPM
Z 0.000	R 987.0	S 253.0	Conc 253.0 PPM
			AVG: 253.0 PPM

2nd Analysis Date: 03/28/2005

R 987.0	S 253.0	Z 0.000	Conc 253.0 PPM
S 253.0	Z 0.000	R 987.0	Conc 253.0 PPM
Z 0.000	R 987.0	S 253.0	Conc 253.0 PPM
			AVG: 253.0 PPM

**RUN DATA**

Number 4

Client: **Bowater**  
Location: **Catawba, SC**  
Source: **No. 3 Recovery Boiler**  
Calibration: **1**

Project Number: **03917.008.005**  
Operator: **T. Simpkins**  
Date: **3 Aug 2005**

Time	O2		NOx	
	mv	%	mv	ppm
Starting time 17:12				
Bag on NOX analyzer- O2 pulling ambient				
17:13	8335	20.7	7386	222
17:14	8334	20.7	7389	222
17:15	8335	20.7	7388	222
17:16	8338	20.7	7388	222
17:17	8339	20.7	7386	222
17:18	8342	20.7	7385	222
17:19	8341	20.7	7384	222
17:20	8342	20.7	7381	222
17:21	8344	20.7	7381	222
17:22	8343	20.7	7379	222
17:23	8344	20.7	7377	222
17:24	8344	20.7	7377	222
17:25	8349	20.7	7375	222
17:26	8345	20.7	7374	222
17:27	8351	20.7	7372	222
17:28	8351	20.7	7370	222
17:29	8350	20.7	7369	222
17:30	8347	20.7	7372	222
17:31	8350	20.7	7374	222
17:32	8349	20.7	7371	222
17:33	8350	20.7	7367	222
17:34	8344	20.7	7361	221
17:35	8346	20.7	7356	221
17:36	8348	20.7	7352	221
17:37	8350	20.7	7343	221
17:38	8350	20.7	7337	221
17:39	8346	20.7	7334	221
17:40	8350	20.7	7332	220
17:41	8345	20.7	7331	220
17:42	8339	20.7	7321	220
17:43	8343	20.7	7325	220



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## APPENDIX E

### PROCESS OPERATING DATA

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**Bowater Incorporated**  
**Recovery Boiler No. 3 Data**  
**August 3, 2005**

	Steam Load MPPH 51fi317a.pv	Opacity % 51ai321a.pv	Black Liquor GPM 51fi308.pv	Liquor Solids % 51di307a.pv	# BLS/Hr	MMlbs BLS/day	Equiv. Pulp Prod ADTP/hr
08/03/05 01:00 PM	510	17	336	66	143,745	3.45	45
08/03/05 01:06 PM	510	17	334	66	143,049	3.43	44
08/03/05 01:12 PM	514	16	336	66	143,851	3.45	45
08/03/05 01:18 PM	507	16	334	66	143,100	3.43	44
08/03/05 01:24 PM	512	16	336	66	143,759	3.45	45
08/03/05 01:30 PM	507	16	335	66	143,356	3.44	45
08/03/05 01:36 PM	501	16	334	66	143,129	3.44	45
08/03/05 01:42 PM	532	16	336	66	143,563	3.45	45
08/03/05 01:48 PM	544	16	335	66	143,241	3.44	45
08/03/05 01:54 PM	558	17	335	66	143,439	3.44	45
08/03/05 02:00 PM	549	17	335	66	143,406	3.44	45
08/03/05 02:06 PM	529	17	335	66	143,491	3.44	45
08/03/05 02:12 PM	523	17	335	66	143,625	3.45	45
08/03/05 02:18 PM	513	17	336	66	143,836	3.45	45
08/03/05 02:24 PM	528	17	335	66	143,491	3.44	45
08/03/05 02:30 PM	546	17	335	67	143,789	3.45	45
08/03/05 02:36 PM	552	17	335	67	144,110	3.46	45
08/03/05 02:42 PM	532	17	335	67	143,923	3.45	45
08/03/05 02:48 PM	497	17	333	67	143,200	3.44	45
08/03/05 02:54 PM	497	17	333	67	143,229	3.44	45
08/03/05 03:00 PM	501	17	334	67	144,089	3.46	45
08/03/05 03:06 PM	518	16	334	67	144,338	3.46	45
08/03/05 03:12 PM	522	16	334	67	144,236	3.46	45
08/03/05 03:18 PM	521	16	333	67	143,849	3.45	45
08/03/05 03:24 PM	510	15	334	67	144,504	3.47	45
08/03/05 03:30 PM	492	16	332	67	143,503	3.44	45
08/03/05 03:36 PM	493	16	334	67	144,255	3.46	45
08/03/05 03:42 PM	509	17	335	67	144,572	3.47	45
08/03/05 03:48 PM	515	17	334	67	144,580	3.47	45
08/03/05 03:54 PM	514	17	335	67	145,056	3.48	45
08/03/05 04:00 PM	517	17	335	67	145,232	3.49	45
08/03/05 04:06 PM	522	17	334	67	144,742	3.47	45
08/03/05 04:12 PM	507	17	335	67	145,077	3.48	45
08/03/05 04:18 PM	495	17	335	67	144,995	3.48	45
08/03/05 04:24 PM	512	17	334	67	144,824	3.48	45

Bowater Incorporated  
Recovery Boiler No. 3 Data  
August 3, 2005

W-I		W-M		W-O		E-I		E-M		E-O	
KV	Ma	KV	Ma	KV	Ma	KV	Ma	KV	Ma	KV	Ma
51ev233b,pv	51ea233a,pv	51ev234b,pv	51ea234a,pv	51ev235b,pv	51ea235a,pv	51ev230b,pv	51ea230a,pv	51ev231b,pv	51ea231a,pv	51ev232b,pv	51ea232a,pv
08/03/05 01:00 PM	35.17	1197.75	43.47	1315.58	39.47	1345.98	39.56	1041.11	45.13	1376.93	41.83
08/03/05 01:15 PM	32.12	769.61	44.89	1131.45	38.86	1348.46	40.33	1197.86	44.39	1377.30	41.65
08/03/05 01:30 PM	35.68	1140.36	43.63	1324.39	37.62	1345.14	39.81	1203.92	44.69	1370.66	41.81
08/03/05 01:45 PM	34.33	1041.03	43.70	1295.51	39.03	1344.57	39.27	1020.10	44.60	1370.50	41.79
08/03/05 02:00 PM	36.31	1250.12	42.43	1319.60	38.43	1342.82	38.38	896.58	44.05	1374.92	41.32
08/03/05 02:15 PM	34.63	1019.93	43.80	1303.74	38.97	1344.25	38.93	889.27	44.71	1336.33	41.71
08/03/05 02:30 PM	35.67	1158.23	42.56	1303.63	38.41	1342.90	38.11	877.64	44.63	1364.73	41.64
08/03/05 02:45 PM	33.81	999.34	43.16	1316.35	38.48	1343.55	37.68	821.99	44.67	1380.07	41.60
08/03/05 03:00 PM	34.30	999.63	43.17	1313.56	38.31	1342.14	39.01	912.24	44.52	1379.28	41.43
08/03/05 03:15 PM	34.68	1088.64	42.74	1315.55	38.23	1341.94	38.38	955.28	44.11	1373.78	41.52
08/03/05 03:30 PM	33.09	942.23	44.15	1204.38	38.94	1343.64	37.79	987.26	45.00	1366.94	41.83
08/03/05 03:45 PM	35.55	1199.60	43.08	1276.33	38.57	1341.80	39.62	981.18	44.67	1356.32	41.74
08/03/05 04:00 PM	34.43	1112.39	43.57	1295.37	38.56	1343.32	39.57	999.77	44.69	1377.80	41.80
08/03/05 04:15 PM	31.93	732.38	44.47	1210.22	39.31	1347.25	39.21	1008.37	44.44	1367.73	41.78